Diagnostic Accuracy of Japanese Posttraumatic Stress Measures after a Complex Disaster: The Fukushima Health Management Survey

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Abstract

Background: The PTSD Checklist (PCL) has also been widely used among traumatized populations to screen people with posttraumatic stress disorder (PTSD); however, the Japanese version of the PCL has yet to be validated. We examined the diagnostic accuracy of the Japanese version of PCL-Specific (PCL-S) and the abbreviated versions of the PCL-S among the evacuees of the Fukushima Daiichi Nuclear Power Plant accident.

Methods: Fifty-one participants were recruited from an evacuee and clinical sample. The PCL-S, Impact of Event Scale-Revised (IES-R), and World Health Organization Composite International Diagnostic Interview were administered. Screening properties of the PCL-S, IES-R, and abbreviated PCL-S against PTSD diagnosis, including sensitivity, specificity, and diagnostic efficiency, were calculated. Receiver operating characteristic curves were drawn and optimal cut-off points were examined.

Results: The sensitivity, specificity, and diagnostic efficiency of the PCL-S was 66.7%, 84.9%, and 79.2%, respectively (at 52, the area under the curve was 0.83). The cut-off point method for the PCL-S performed better than did the symptom cluster method. The screening properties of the abbreviated versions were comparable to those of the full version.

Conclusions: The Japanese version of the PCL-S showed moderate diagnostic accuracy and improved performance over the IES-R for DSM-IV-based PTSD diagnosis. The Japanese version of the PCL-S was a reliable and valid measure, and its diagnostic accuracy was reasonable for both full and abbreviated versions.

Key words

Fukushima Nuclear Accident, Mass Screening, Post-Traumatic Stress Disorders, Receiver Operating Characteristic Curve, Sensitivity and Specificity,

Introduction

In the aftermath of a disaster, posttraumatic stress disorder (PTSD) is a common and important psychiatric disorder (North and Pfefferbaum. 2013). The prevalence of probable PTSD has been estimated in the range of 2.3% to 44.6%, depending on the population, type of trauma, elapsed period since trauma exposure, and instrument used (Neria et al. 2008). In estimating the prevalence of PTSD, various traumatic stress instruments have been used, including the PTSD Checklist (PCL) (Weathers et al. 1993) and Impact of Event Scale-Revised (IES-R) (Weiss and Marmar. 1997). The diagnostic accuracy of these instruments differs based on the characteristics of the target population and the base rate of PTSD (Terhakopian et al. 2008). Thus, it is important to calibrate the instrument and examine the optimal cut-off point, depending on the study population and context.

The PCL is a widely used questionnaire to assess severity of traumatic reaction and to screen those with a PTSD diagnosis. There are several versions of the PCL, including the PCL-Civilian version, PCL-Military version for people with combat experience, and PCL-Specific for people who have experienced specific traumatic events. Its psychometric and screening properties have been well reported (McDonald and Calhoun. 2010; Wilkins et al. 2011), and there are several abbreviated versions to improve clinical utility (Bliese et al. 2008; Lang and Stein. 2005). The PCL has also been used among traumatized Japanese populations (Yasumura et al. 2012; Yabe et al. 2014; Sakuma et al. 2015); however, the Japanese version of the PCL has yet to be validated.

Accordingly, the aim of this study was to 1) examine the psychometric property of the Japanese version of the PCL-S, and 2) compare the diagnostic accuracy of the PCL-S to the IES-R as well as the abbreviated version of the PCL-S among the evacuees of the Fukushima Daiichi Nuclear Power Plant (NPP) accident.

Methods

Participants

To recruit people with a range of traumatic reaction levels, we included evacuee and clinical participants. The inclusion criteria for evacuee participants were people who 1) used to live within the government-designated evacuation zone, 2) responded to the Mental Health and Lifestyle Survey of the Fukushima Health Management Survey conducted in 2013 (Yasumura et al. 2012), and 3) were at least 16 years old. The candidates were selected based on Kessler's 6 items for non-psychological distress (K6) (Kessler et al. 2003; Sakurai et al. 2011) and PCL-S scores in the survey; 10 each from the low-, middle-, and high-score categories. The inclusion criteria for clinical participants were patients who 1) visited the Department of Psychiatry of Fukushima Medical University Hospital and its related institutions, 2) received a clinical diagnosis of PTSD or adjustment disorder from the attending psychiatrist, 3) were permitted to participate in this study by the psychiatrist, and 4) were at least 16 years old. In total, 38 evacuee participants and 13 clinical

participants were recruited.

Procedure

Participants were asked to fill in the self-administered PCL-S and IES-R, followed by a structured interview using the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). The second PCL-S was administered after 1 week by mail to examine test-retest reliability.

Screening instruments

The PCL is a self-administered questionnaire assessing the 17 symptoms of PTSD based on the DSM-IV (American Psychiatric Association. 1994), which includes three symptom clusters: re-experiencing, avoidance/numbing, and arousal. Participants indicated whether they were bothered by symptoms due to the traumatic event in the past month on a 5-point Likert scale (1 = not at all to 5 = extremely), with the sum of the score ranges from 17 to 85. We used the PCL-S, with the Great East Japan Earthquake—including the earthquake, tsunami, and NPP accident—specified as the traumatic event.

The original PCL has a Cronbach's alpha of 0.939, and its correlation with the Clinician-Administered PTSD Scale (CAPS) for DSM-IV is 0.929. The sensitivity and specificity

for PTSD diagnosis are 0.778 and 0.864, respectively, with a cut-off point of 49/50, and 0.944 and 0.864, respectively, with a cut-off point of 43/44 among motor vehicle accident survivors or survivors of sexual assault in the US (Blanchard et al. 1996).

After the English-Japanese translation was authorized by the original author of the scale, a Japanese psychiatrist translated the original English version of the PCL-S into Japanese, and then it was back-translated by two native English-speaking bilingual scientists. The back-translated version was then compared to the original, and adjustments were made to the Japanese version considering linguistic and semantic equivalents.

There are two evaluation methods: the cut-off point method for the total sum of the 17 items and the symptom cluster method (SCM), which requires one re-experiencing, three numbing/avoidance, and two hyperarousal symptoms according to the DSM-IV. The symptom is regarded as present for scores of 3 or more, representing at least moderately bothersome symptoms, as well as for scores of 4 or more, representing at least quite a bit symptoms, assuming that Japanese people tend to present psychological symptom less (Harada et al. 2012).

Abbreviated versions of the PCL have been proposed, and we chose to examine the following three versions for brevity and for optimal diagnostic utility: Bliese's four items, which include 1. Intrusive recollections, 5. Reaction to reminders, 7. Avoid reminders, and 15. Concentration difficulties (Bliese et al. 2008), as well as Lang and Stein's four and six items (Lang

and Stein. 2005). Lang and Stein's four items include 1. Intrusive recollections, 4. Distress at reminders, 7. Avoid reminders, and 16. Hypervigilance. The six items include 1. Intrusive recollections, 4. Distress at reminders, 7. Avoid reminders, 10. Detached from others, 14. Irritability/anger, and 15. Concentration difficulties.

The IES-R is a self-administered questionnaire on 22 traumatic symptoms rated on a 5-point Likert scale (0 to 4) (Weiss and Marmar. 1997). The total scores range from 0 to 88 with higher scores representing greater severity. Japanese version of the IES-R (IES-R-J) has been validated (Asukai et al. 2002). Cronbach's alphas for the subscales are 0.86–0.91 for intrusion, 0.81–0.90 for avoidance, and 0.80–0.86 for hyperarousal (Weiss. 2004). Although the IES-R was not developed for making categorical PTSD diagnosis, various cut-off points have been proposed to indicate probable PTSD, with a range from 19 to 35 (Asukai et al. 2002; Creamer et al. 2003; Chen et al. 2011; Bienvenu et al. 2013).

Reference standard

PTSD diagnosis was made using the PTSD section of the WHO-CIDI (Kessler and Ustun. 2004). This structured interview was conducted by six health professionals who underwent interview training. The interviewers were blind to the clinical diagnosis.

Analysis

We analyzed the data of participants who responded to the PCL-S without missing answers (n = 48). For test-retest reliability, we examined only those who completed the PCL-S at both time points (n = 33). All participants experienced at least one event of the disaster, and thus, we included all in the analysis.

First, to examine psychometric properties, we calculated Cronbach's alpha to evaluate the reliability of the PCL-S. We then calculated Spearman's rank-order correlation of the PCL-S scores 1 week apart to examine test-retest reliability. We also calculated Spearman's rank-order correlation between the PCL-S and IES-R to examine concurrent validity. Then, to examine diagnostic accuracy of the PCL-S and IES-R for PTSD diagnosis over the past 30 days based on the WHO-CIDI, we calculated sensitivity, specificity, and diagnostic efficiency, which is the proportion of those correctly categorized as true positive and true negative. PTSD diagnosis was made according to the DSM-IV and International Classification of Diseases-10th Revision (ICD-10) (World Health Organization. 1993). Area under receiver operating characteristic (ROC) curves (AUCs) and their 95% confidence intervals (CIs) were calculated, and the optimal cut-off point was examined using the Youden method (Fluss et al. 2005). Similarly, the screening properties for the abbreviated versions of the PCL-S were examined. All statistical analyses were performed using Stata 13.0 for Windows (StataCorp LP, College Station, TX).

Ethical consideration

The study was approved by the Ethics Committee of Fukushima Medical University (Number1316 and 1489) and of National Center of Neurology and Psychiatry (A2014-160). After informing participants that their participation was voluntary, that they could withdraw from the study at any time, and that they would not be disadvantaged in any way if they chose to withdraw or decline to participate, receipt of a returned questionnaire was assumed to indicate consent for the Mental Health and Lifestyle Survey of the Fukushima Health Management Survey, and written consent was obtained for the diagnostic study. Authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Results

Participants' characteristics

This study was conducted from November 2013 to March 2014. The participants who met the diagnostic criteria for PTSD in the past 30 days was 15 (31.3%) by the DSM-IV, and 14 (29.2%) by the ICD-10 (Table 1). Among the participants, 24 (50.0%) were above the conventional cut-off points of 44, and 19 (39.6%) were above the cut-off of 50. A comparison of PCL-S scores by the

experience of the Great East Japan Earthquake, other traumatic events, and functional impairment is presented in Table 2. There were no associations between PCL-S scores and the experience of earthquake, tsunami, NPP accident, or life-threatening experience during the Great East Japan Earthquake or another traumatic event. PCL-S scores were higher among those who reported functional impairment than they were among those who did not (median score: 50 vs. 35, respectively, $z = 3.1$, $p = 0.002$).

Psychometric properties of the PCL-S

Cronbach's alpha of the PCL-S was 0.92 for all 17 items, and 0.83 for re-experiencing, 0.82 for avoidance and numbing, and 0.79 for hyperarousal. For test-retest reliability, the mean score (SD) was 42.4 (15.0) for the first test and 41.2 (15.7) for the second, with a difference of 1.27 ($t = 0.860$, $p = 0.396$). Spearman's rank-order correlation was 0.85 ($p < 0.001$). Spearman's rank-order correlation between PCL and IES-R-J scores was 0.90 ($p < 0.001$) among those who completed both scales ($n = 47$).

Diagnostic accuracy of the PCL-S

The flow of participants who underwent the PCL-S and subsequent PTSD diagnosis (past 30 days) according to the DSM-IV is presented in Fig 1. The median PCL-S score was higher among those

with PTSD than that of those without (58 and 36, respectively).

The indicators of the diagnostic accuracy of the PCL-S and IES-R are presented in Table 3. The AUC was 0.83 (95% CI: 0.71–0.95) for the DSM-VI and 0.79 (95% CI: 0.65–0.92) for the ICD-10, suggesting moderate accuracy for both. The optimal cut-off point was 52 for the DSM-VI and 46 for the ICD-10. In reference to the IES-R, AUC was 0.70 (95% CI: 0.56–0.85) for the DSM-VI and 0.75 (95% CI: 0.60–0.89) for the ICD-10. The ROC curves of the PCL and IES-R for PTSD diagnosis based on the DSM-IV and ICD-10 are presented in Fig. 2.

Regarding the SCM for the PCL-S, the AUC was 0.68 (95% CI: 0.53–0.83) for the DSM-VI with assumption of 3 or above as symptom present and 0.70 (95% CI: 0.57–0.84) with assumption of 4 or above as symptom present. Agreement on PTSD diagnosis was 68.8% (kappa = 0.33, SE = 0.14, z = 2.37, p = 0.009) between SCM (3+) and the DSM-IV and 79.2% (kappa = 0.46, SE = 0.14, z = 3.34, $p < 0.001$) between the SCM (4+) and the DSM-IV.

The details on the screening properties for DSM-IV-based PTSD diagnosis of the three abbreviated versions of the PCL-S at its optimal cut-off points are presented in Table 2. The AUC for the Bliese's four items was 0.86 (95% CI: 0.75–0.98) at the cut-off point of 12 and for Lang and Stein's four items was 0.82 (95% CI: 0.70–0.95) at the cut-off point of 13. The AUC for the six items proposed by Lang and Stein was 0.85 (95% CI: 0.73–0.97) for the DSM-VI at the cut-off point of 17. The ROC curves for the abbreviated version of the PCL-S are presented in Fig. 3.

Discussion

The psychometric properties of the Japanese version of the PCL-S showed satisfactory internal consistency, and very strong correlation in examining test-retest reliability, and concurrent validity with IES-R. The Japanese version of the PCL-S demonstrated moderate diagnostic accuracy and improved performance over the IES-R for DSM-IV-based PTSD diagnosis for the past 30 days. The cut-off point method for PCL performed better than did the SCM.

Psychometric properties of PCL-S

The internal consistency of the Japanese version of the PCL-S was satisfactory, and the Cronbach's alpha of 0.92 was comparable to a previous report in terms both the overall scale as well as its subscales (Wilkins et al. 2011). The test-retest reliability at 1 week was 0.90, which fell in the range of 0.68 to 0.92 observed in previous studies (Wilkins et al. 2011). Concurrent validity was confirmed, as demonstrated by the Spearman's rank-order correlation of 0.90 between the total scores of the PCL-S and IES-R. Overall, the Japanese version of the PCL was demonstrated to be reasonably reliable and valid.

Diagnostic accuracy of PCL-S

Based on the ROC curves, we determined that the optimal cut-off point of the Japanese version of the PCL-S for past-30-days PTSD diagnosis was 52 for the DSM-IV and 46 for the ICD-10 among individuals who experienced the Great East Japan Earthquake and Fukushima NPP accident. Our result lies on the higher end of the reported score range from 32 to 50, which varies depending on the study population and type of trauma exposure (McDonald and Calhoun. 2010). The screening properties—sensitivity of 66.7% and specificity of 84.9% at a cut-off point of 52—fall within the range observed in previous studies, which have found sensitivity to be 60–94% and specificity 86–99% for the PCL-S (McDonald and Calhoun. 2010).

Traditionally, the optimal cut-off point has been determined based on the ROC curve by balancing sensitivity and specificity; however, this approach has recently come into question (Wald and Bestwick. 2014). The optimal cut-point should be examined depending on the intended purpose of the use (McDonald and Calhoun. 2010). For example, diagnostic efficiency was relatively high (79.2%) at the cut-off point of 52 based on the ROC curve, with a low sensitivity (66.7%) and high specificity (84.9%). To capture more broadly people at risk of PTSD following a complex disaster in a community, a lower cut-off point is desirable, as it increases the sensitivity. Then, further detailed assessment is needed to confirm the diagnosis.

In comparing the diagnostic accuracy of PCL-S and IES-R, we found that the PCL-S was superior to the IES-R in detecting past-30-days PTSD according to the DSM-IV definition. On the

other hand, at the cut-off point of 37, the IES-R performed better in discriminating PTSD cases and non-cases according to the ICD-10 definition than it did by the DSM-IV definition. The IES-R was originally developed to measure degree of traumatic distress, not to diagnose PTSD. Nevertheless, the IES-R may have performed better in screening cases of PTSD according to the ICD-10, as PTSD is operationalized as a broader concept compared to the definition in the DSM-IV (Van Ameringen et al. 2011). The cut-off point of 37 was higher than the previously proposed cut-off points of 19 to 35. Our study may have demonstrated a higher cut-off point because of the different trauma and time since exposure.

The cut-off point method performed better than did SCM, as the AUC was 0.83 for the cut-off point of 52, and 0.68 for the SCM. Interestingly, if we assume the presence of symptoms for responses of 4 points or more, performance was better than it was when assuming symptoms at 3 points or more. Kappa was higher with symptom presence at 4 points or more. These improvements resulted from increased specificity when 4 points indicated symptom presence. As the participants presented with a high degree of traumatic distress, a higher threshold for determining symptom presence may have decrease the number of false positives, resulting in higher specificity. To increase specificity in detailed secondary assessment, the use of the SCM with 4 points or more indicating symptom presence may be preferable.

The results supported the use of an abbreviated version of Japanese version of PCL-S, both

for the four- and six-item versions, as the screening properties were comparable or even better than were those of the full PCL-S. The best cut-off point was 12 for Bliese's four items and 17 for Lang and Stein's six items, and each was higher than the previous report of 7 and 14, respectively. In the aftermath of a disaster, the use of Lang and Stein's four items was tested among the people affected by Hurricane Katrina, but this usage was not validated (Hirschel and Schulenberg. 2010). In our study, the sensitivity of Lang and Stein's four items was 60.0%, which was the lowest of the abbreviated versions, and this may not be appropriate to capture broadly those at high risk of PTSD diagnosis. Further studies on abbreviated versions of the PCL-S are needed to draw conclusions, as there are limited empirical studies on the abbreviated versions.

Limitations

There are several limitations of this study. Although we recruited participants with different degrees of traumatic reactions, the sample size was relatively small. Specifically, we could not recruit targeted number of clinical participants, because there were fewer patients with PTSD at the clinical settings because there were few patients with the diagnosis of PTSD at medical institutions for unknown reason. A further validation study with a larger and more representative sample is warranted. Second, although we recruited people who experienced the Great East Japan Earthquake, the symptoms measured in this study reflect not only the traumatic event, but also, and perhaps more

largely, secondary stressors after the disaster, as suggested by previous research (Lock et al. 2012). This concern is supported by the finding that there was no difference in PCL-S scores by experience of disaster or life-threatening experience. The relationship between reaction to traumatic events and secondary life stressors should be differentiated in further studies. Lastly, the diagnostic criteria of PTSD have changed with the introduction of the DSM-5 (American Psychiatric Association. 2013), and the revision of ICD-10 will follow shortly. The use of PCL should be examined with this dynamic context in mind.

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Fig. 1. Flowchart of the Participants and Assessment Results by PCL-S and Past-30-Days PTSD Diagnosis Made by WHO-CIDI.

PCL-S: PTSD Checklist-Specific. PTSD: Posttraumatic Stress Disorder. WHO-CIDI: World Health Organization Composite International Diagnostic Interview

Fig. 2. The ROC Curves of PCL-S and IES-R Scores for Past-30-Days PTSD Diagnosis Based on the DSM-IV and ICD-10.

ROC: receiver operating characteristic; PCL-S: PTSD Checklist-Specific; IES-R: Impact of Event Scale-Revised; PTSD: posttraumatic stress disorder; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition; International Classification of Diseases-10.

Fig. 3. The ROC Curves of the Three Abbreviated Versions of the PCL-S for Past-30-Days PTSD Diagnosis Based on the DSM-IV.

ROC: receiver operating characteristic; PCL-S: PTSD Checklist-Specific; PTSD: posttraumatic stress disorder; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition.

Table 1. Gender, Age, and Proportion of PTSD of the participants

		Overall		Evacuee (n=35)		Clinical (n=13)	
		n or mean	% or SD	n or mean	% or SD	n or mean	% or SD
Gender							
	Men	23	47.9	16	45.7	7	53.9
	Women	25	52.1	19	54.3	6	46.2
Age; mean, SD							
		62.5	14.8	66.6	11.6	51.5	17.2
PTSD Diagnosis							
Past 30 days	DSM-IV	15	31.3	9	25.7	6	46.2
	ICD-10	14	29.2	9	25.7	5	38.5
Past 12 months	DSM-IV	17	35.4	11	31.4	6	46.2
	ICD-10	18	37.5	13	37.1	5	38.5
Lifetime	DSM-IV	20	41.7	14	40.0	6	46.2
	ICD-10	21	43.8	16	45.7	5	38.5
PCL	44+	24	50.0	19	54.3	5	38.5
	50+	19	39.6	14	40.0	5	38.5

PTSD: posttraumatic stress disorder, DSM-IV: Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition; ICD-10: International Classification of Diseases-10th Edition, PCL: PTSD Checklist..

Table 2. Comparison of PCL-S scores by Experience of the Great East Japan Earthquake, Other Traumatic Events, and Functional Impairment

	n	Median	25th, 75th percentiles	z†	p
Overall	48	43.5	34, 53		
Experience of the Great East Japan Earthquake					
Earthquake					
Yes	42	44.5	34, 55	1.3	0.201
No	6	38.5	26, 43		
Tsunami					
Yes	21	43	34, 58	0.2	0.827
No	27	44	36, 53		
NPP accident					
Yes	46	43.5	34, 53	-0.4	0.661
No	2	46	39, 53		
Life-threatening experience during the Great East Japan Earthquake‡					
Yes	34	44.5	36, 58	1.3	0.212
No	13	36	30, 50		
Missing	1	33			
Traumatic experience other than the Great East Japan Earthquake‡					
Yes	9	50	44, 53	1.3	0.204
No	38	40	30, 53		
Missing	1	35			
Functional impairment§					
Yes	29	50	38, 58	3.1	0.002
No	19	35	22, 45		

PCL-S: PTSD Checklist-Specific; NPP: nuclear power plant.

† Mann–Whitney U-test. ‡ n = 47 due to one missing observation. § Yes: often, sometimes; No: rarely, never.

Table 3. Screening Properties for PTSD Diagnosis of the PCL-S and IES-R among Evacuees of the Fukushima NPP Accident

	n	ROC Area	95%CI Lower, Upper		Optimal cutoff	Sensitivity (%)	Specificity (%)	Diagnostic efficiency (%)	LR+	LR-
Cut-point method for PCL-S and IES-R										
PCL-S total score										
DSM-IV	48	0.83	0.71	0.95	52	66.7	84.9	79.2	4.40	0.39
ICD-10	48	0.79	0.65	0.92	46	78.6	70.6	72.9	2.67	0.30
IES-R										
DSM-IV	49	0.70	0.56	0.85	37	73.3	62.5	66.0	1.96	0.43
ICD-10	49	0.75	0.60	0.89	37	78.6	63.6	68.1	2.16	0.34
Symptom cluster method for PCL-S										
3+ on the Likert scale as symptom present										
DSM-IV	48	0.68	0.53	0.83	1	66.7	69.7	68.8	2.20	0.48
4+ on the Likert scale as symptom present										
DSM-IV	48	0.70	0.57	0.84	1	46.7	93.9	79.2	7.70	0.57
Abbreviated versions										
Bliese's four items										
DSM-IV	48	0.86	0.75	0.98	12	73.3	84.9	81.3	4.84	0.31
Lang and Stein's four items										
DSM-IV	48	0.82	0.70	0.95	13	60.0	87.9	79.2	4.95	0.46
Lang and Stein's six items										
DSM-IV	48	0.85	0.73	0.97	17	80.0	75.8	77.1	3.30	0.26

PTSD: posttraumatic stress disorder; PCL-S: PTSD Checklist-Specific; IES-R: Impact of Event Scale-Revised; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition; ICD-10: International Classification of Diseases-10; AUC: area under the receiver operating characteristic curve; CI: confidence interval; OCP: optimal cut-off point; Sen.: sensitivity; Sp.: specificity; DE: diagnostic efficiency; LR+: positive likelihood ratio; LR-: negative likelihood ratio

† Optimal cut-point=1 means PTSD diagnosis present according to the symptom cluster method.

Figure 1

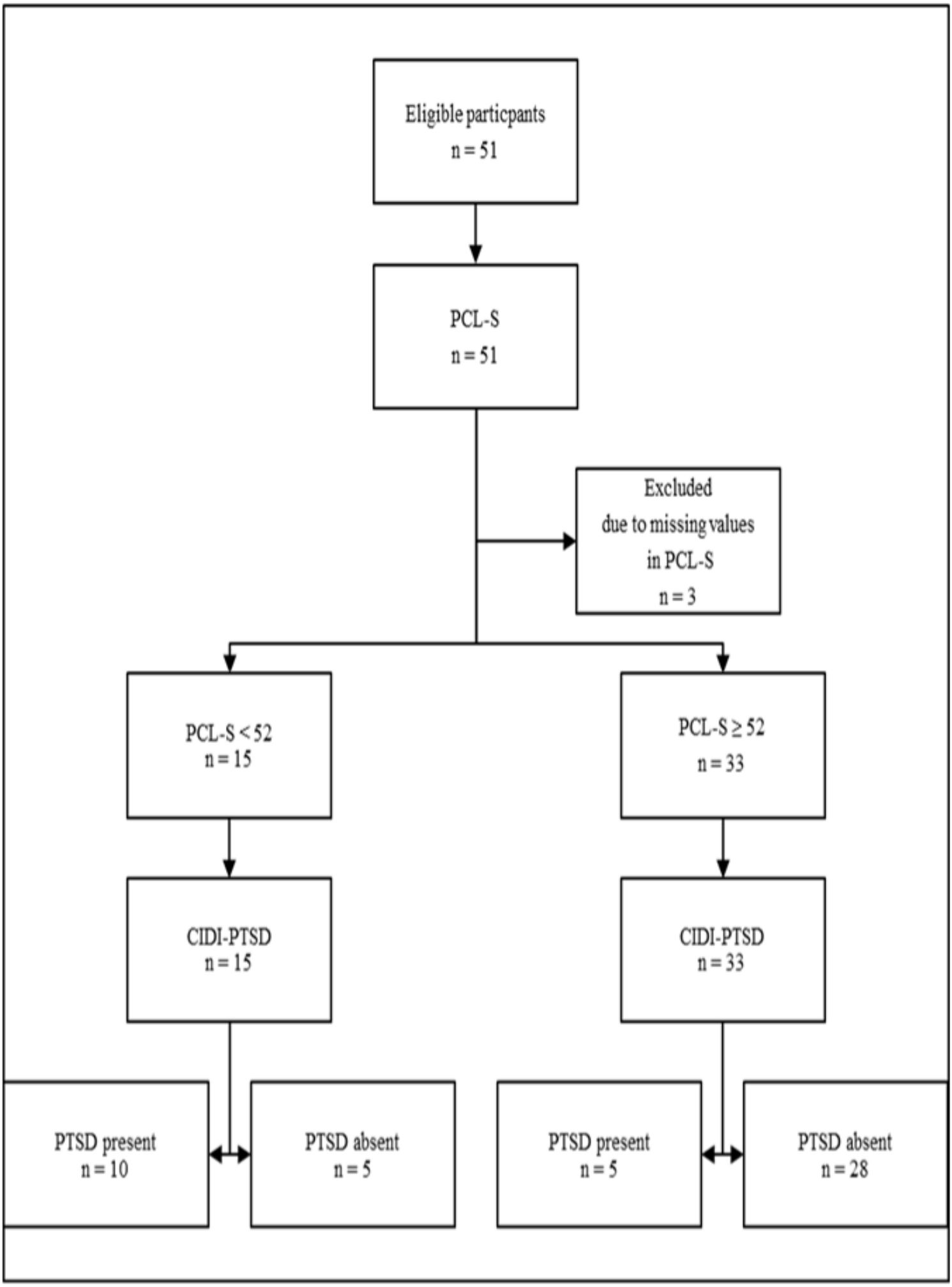

Eligible particpants
n = 51
PCL-S
n = 51
Excluded
due to missing values
in PCL-S
n = 3
PCL-S < 52
n = 15
PCL-S ≥ 52
n = 33
CIDI-PTSD
n = 15
CIDI-PTSD
n = 33
PTSD present
n = 10
PTSD absent
n = 5
PTSD present
n = 5
PTSD absent
n = 28

Figure 2

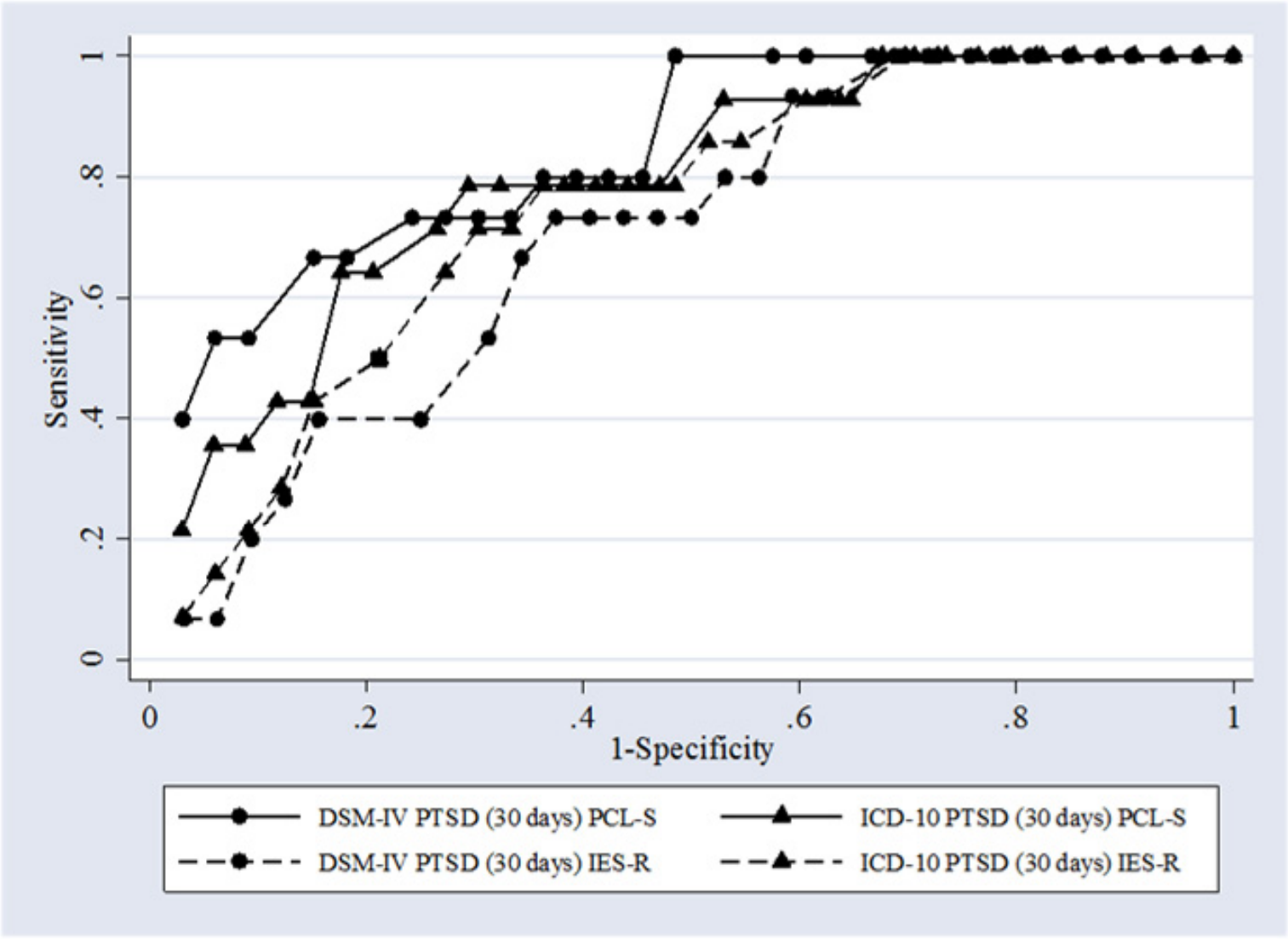
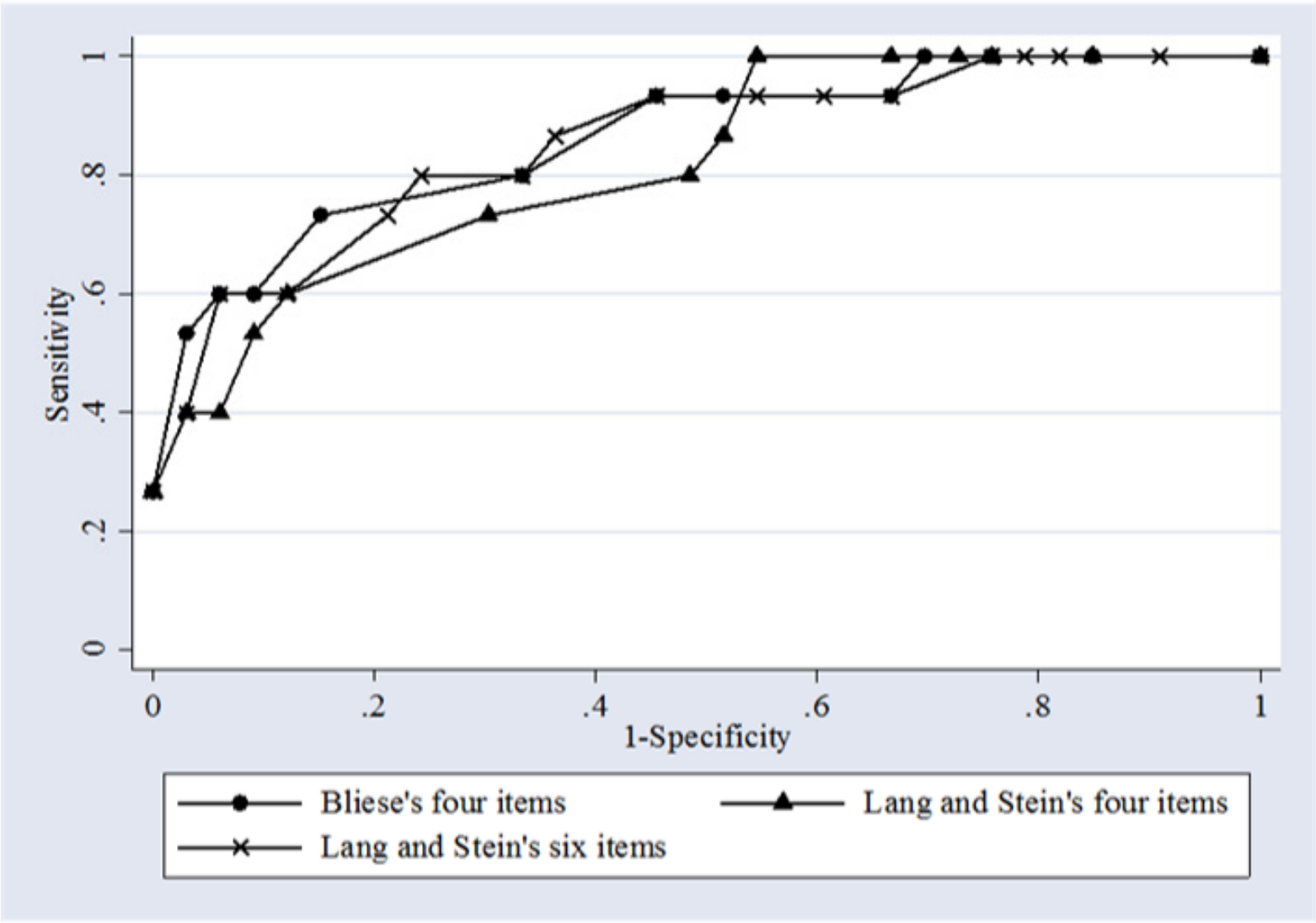

Sensitivity
0
.2
.4
.6
.8
1
1-Specificity
0
.2
.4
.6
.8
1
DSM-IV PTSD (30 days) PCL-S
ICD-10 PTSD (30 days) PCL-S
DSM-IV PTSD (30 days) IES-R
ICD-10 PTSD (30 days) IES-R

Figure 3


Sensitivity
0
.2
.4
.6
.8
1
1-Specificity
0
.2
.4
.6
.8
1
Bliese's four items
Lang and Stein's four items
Lang and Stein's six items